стат позволяет проводить измерения при температурах от 78 К до 373 К и при вакууме до 10^{-6} торр. Необходимое радиационное воздействие возможно осуществить при помощи рентгеновского аппарата УРС-1,0 и электронной пушки МИРА-2Д. Эксперимент проводится с измерением полного световыхода или световыхода в определенной спектральной полосе при помощи монохроматора МДР-2.

Для проверки работоспособности установки был проведен эксперимент на тестовом образце анион-дефектного корунда ТЛД-500 (Al_2O_3:C) с известными параметрами, измерены кривые высвечивания ОСЛ после облучения рентгеновским излучением в течение 10, 20, 30 минут (U=55 кВ, I=16 мА) (Рис. 1). Экспериментальные кривые аппроксимированы суммой двух экспоненциальных функций. Приводятся интенсивности компонент высвечения, постоянные времени затухания и светосумма.

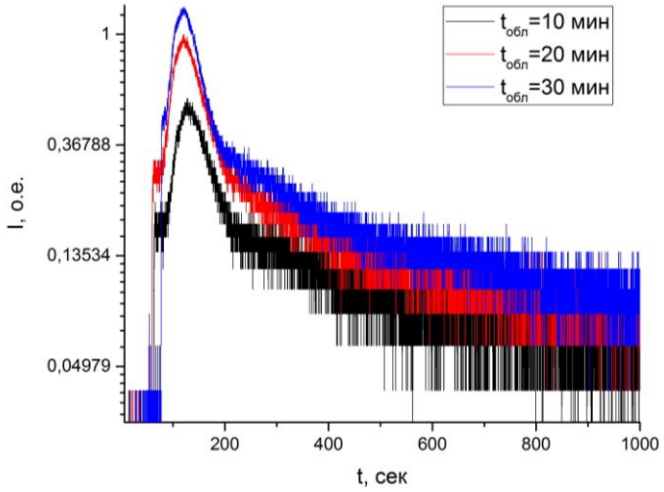

Рис. 1. Кривые высвечивания ОСЛ Al_2O_3:C при разных временах облучения

EFFECT OF PR AND GD DOPING ON THE TRANSPORT PROPERTIES OF YBCO SUPERCONDUCTOR

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Elemental substitutions play an important role in understanding the nature of superconductivity in high T_c superconductors. Substitutions of Cu by metals ions in YBCO system have been studied [1, 2]. In this work we investigated the effect of doping magnetic ions of R = Pr and Gd on Cu-deficient $Y_1Ba_2Cu_{3-x}R_xO_{7-\delta}$ system. Our aim is to study and compare the Metal-Insulator Transition and the observed incomplete superconductor to insulator Superconductor-Insulator Transition crossovers in the two systems and investigate its origin.

Polycrystalline superconducting samples with the nominal compositions $Y_1Ba_2Cu_{3-x}R_xO_{7-\delta}$ where R is Gd and Pr and (x=0, 0.05, 0.1, 0.2, 0.3, 0.4, 0.5 and 0.8) have been prepared using solid state reaction technique. X-ray diffraction (XRD),Resistivity measurements, Scanning electron microscope (SEM), Electron dispersive X-ray (EDX) and Electron spin resonance (ESR) have been measured to study the prepared samples.

Resistance measurements showed a suppression of the critical transition temperature with increasing of Gd-content and this suppression increased in case of Pr doping in addition to a normal-state metal-to-insulator transition. There are two parameters responsible for the depression of *T*c, the Abrikosov effect is working overall the doping range. In addition to this effect the charge of the doped ion is effective at low concentration around x=0.05. The excess positive charge imparted to the doping position scatters holes during the percolation from the chains to the planes. A normal-state metal-to-insulator crossover has been observed with x > 0 and x = 0.3 for Gd(Cu) and Pr(Cu), respectively. Moreover, Pr(Cu) with x = 0.3 showed incomplete superconducting transition, while the same content showed a complete transition in case of Gd(Cu). Furthermore, a superconductor-to-insulator crossover has been observed for Pr with x = 0.3 and for Gd with x > 0.3 at temperatures less than 50 K.

1. Jamadar T.A. and Ghosh A.K., Physica C, 469, 1971-1976 (2009).
2. Babu, T.G.N. and Greaves C., Physica C, 207, 44-50 (1993).

ПОЛУЧЕНИЕ НАНОПОРИСТОГО МАТЕРИАЛА SI/SIO_2/ZN ХИМИЧЕСКИМ И ЭЛЕКТРОХИМИЧЕСКИМ МЕТОДАМИ ОСАЖДЕНИЯ

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OBTAINING OF THE Si/SiO_2/Zn NANOPOROUS MATERIAL WITH CHEMICAL AND ELECTROCHEMICAL DEPOSITION TECHNIQUES

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Annotation. We have reported results on ZnO nanoclusters deposition into SiO_{2por}/Si structures. SiO_2/Si samples were irradiated with ^{131}Xe ions using an ion cyclotron accelerator DC-60 at Astana, Kazakhstan. Afterwards, nanoporous channels were fulfilled with Zn using chemical and electrochemical deposition techniques. Morphology of synthesized Si/SiO_2/Zn system was investigated using scanning electron microscopy.